

Technological Capability, Innovativeness and the Performance of Manufacturing Small and Medium Enterprises (SMEs) in Developing Economies of Africa

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Abstract: *The contemporary strategic management framework is unable to fully address the questions concerning the role of technological capability in a complex competitive and dynamic environment. Consequently, how manufacturing SMEs firms can effectively develop technological capability (TC) to rapidly react to the dynamic and turbulence operating environment to achieve and maintain better competitive advantage becomes imperatives. The aims of this paper is to elaborate the above-mentioned subjects and put forward a framework that conceptually focused on the development of technological capability that support developing economies business firm's innovativeness in the rapidly changing market environments to survive and sustain competitiveness. To explore the relationships exist between the constructs and put forward a conceptual framework, a systematic evaluation of the available existing literature from both theoretical and empirical studies has been made. Consequently, the study established theoretically how technological capability help firms develop a novel ideas that promote and enhance innovativeness to efficiently respond to dynamic environment. The study also demonstrated the need for empirical examination of the role TC on SMEs innovativeness to improve performance.*

Keyword: *Technological Capability; Innovativeness; SMEs Performance*

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I. Introduction

Manufacturing sector has been acknowledged as the major driver of economic transformation and development. It is an engine for providing goods and services, employment generation and improvement of income. Manufacturing sector contributed about 10% to Nigeria's economic output before oil boom in the 1970s, however, increase in revenues from oil caused a decline share contribution of the sector to the country's GDP [1]. The sector was the second to least in contributing to the country GDP growth, accounting for not more than 5 percent [2]. The decline include oil prices in the recent year has force onto the country some economic crises, which lead to the development of Economic Recovery and Growth Plan (ERGP) this year. The plan aimed to stimulate the productive sector of the economy by introducing government support through utilization of available limited foreign exchange to finance importation of industrial inputs [3].

Although, the manufacturing becomes one of the fastest growing sectors. The sector grew from 1999 and 2009 by an average of 7.9% and between 2010 and 2014 by an average of 16.9%, while the contribution to GDP grew from 6.5% in 2010 to 9.2% in 2014 [4]. In the year 2016, the contribution of Nigerian manufacturing sector actually dropped by 4.23% as a result of compounded problem such as lacks of innovativeness, depreciation in exchange rate and higher energy cost facing the sector over the years [5]. However, these statistical data fall to explain clearly why the country is not moving significantly toward value-added activity, industrial technological upgrading, diffusion and linkages with other economy [6]. Technological development in Nigerian industrial sector is still constrained in several ways; low investment, skills, infrastructure, low level of R&D, expensive patenting and poor enabling business environment, thus the capacity of manufacturing enterprises to innovate largely remains untapped [7]. The main aims of this paper is evaluates the role of technological capability on the performance of Nigerian manufacturing SMEs.

II. Literature Review/Conceptualization

Technological Capability, SMEs Innovativeness and Performance

Technology capability has been described as an organization ability to identifying, acquiring, developing and utilizing the state of art in product, process and technologies so as to produce the most superior

product that best satisfies the current requirement of the market and improve the organization performance. In an industrial set up there is always strong interrelation between technological capability, innovation and other firm's activities, thus TC is an important part of company's overall strategy [8]. TC help firms to be more flexible in their designs, thus, innovative companies do not encountered much problem in adapting to the rapidly changing business environment [9].

Technological capability and innovation are the pillars of economic development [10], technology helps firms improves business processes and result in cost effectiveness. Generally, organization uses technological capability in carrying out their business routine, processes and activities in order to improve performance [9b]. Therefore, according to reference [11] technology-oriented firm develop the ability to identify and acquire a substantial technological knowledge and to utilize these technologies in the process of developing new products. Similarly, technological-oriented organization demonstrated enthusiasm in terms of technology pioneering and in offering differentiated products which led to higher performance [12]. Reference [13], emphasizes the importance of high commitment to technological capability in response to changing technological conditions to achieve the most efficient and effective means to serve existing and new markets with new and better products and services

In addition to the above, reference [14], posit that developing TC improves firm's learning, resource allocation, organizing capabilities, and manufacturing capabilities. Therefore firm's ability to understand, exploit and adapt to a rapidly changing technology is a key factor in improving performance through the production of new and better products which helps firm increase its market shares, reduce cost of production and increase the overall performance [15]. However, due to the lack of resources, weak innovation and technological capabilities most SMEs in developing countries like Nigeria resort to acquiring technologies from external sources [16]. Nevertheless, to survive and remain competitive in this world of globalization and liberalization of trades, SMEs must adapt to use advanced technology, technical skills, and engage in innovative R&D as a strategy [17].

Nevertheless, TC is not just a set of tools and the skillful demonstration of its applications; it is honestly, a cultural mindset that promotes the acquisition and utilization of skills, methods and techniques acquired as a fundamental part of the society [18]. Thus, technological development involves a process of organizing resources and systematic integration of contemporary and traditional technologies structured and fitted into practicable projects designed for a particular purpose [19]. Therefore to reap the benefits of the development in science and technology, developing country like Nigeria must reconcile its traditional cultural environment with various global condition which has been largely molded by science and technology. In fact, there are some elements of Nigeria's rich cultural legacy that has led to the development and mastery of technical skills particularly in the art and craft, textile industry, food technology and music technology [20].

However, Nigerian industrial sector has extensively depended on external technology to improve its manufacturing facilities. Though some of the facilities are up-to-date and equate favorably with those in developed countries, most are surrounded with inefficiencies and high production costs. This has been attributed to lack skills and abilities to adapt the foreign technologies to suit indigenous environments and to develop innovative capabilities by most firms [21]. Nonetheless, foreign technologies provide opportunities for learning and acquiring indigenous capabilities.

Various researches conducted on the relationship between firm's technological capability, innovation processes and performance has demonstrated positive significant influences. Reference [13b] demonstrated that technological capability significantly influence firm's innovation, while in turn an innovation activity influences performance significantly. Similarly, reference [11b] believes that technological capability is an important survival capability for a firm operating in a highly competitive environment and wishes to develop a superior innovation than competitors. Therefore, reference [22] identifies in descending order five benefits of advancing technological capability in manufacturing undertaking; this include reduced cycle-time; increase market share; zero-defects production process; return on investment, and intensive production. Reference [23] opined that TC has greatly improved the production capacity, volume of turnover, number of business contact, improve revenue and growth and reduced the cost of production and operation of SMEs in Nigeria.

There two foremost dimensions of TC which consist of the activities and strategies [24]; the activities dimension consist of R&D in the case of product development, patenting, and problem solving, while the strategies consist of the technology leadership capability and technology sourcing and utilization strategy [24, 25]. This study therefore presumes that these technological dimensions might have a significant influence on the innovation and performance of Nigerian manufacturing SMEs. It has been urged that technological advancement bound out of internal R&D is the most crucial factors behind increases in productivity and growth of most successful business organization [26]. Technology capability is the core in developing competitive advantage because combination of specific technology resource provides absolutely inimitable abilities and distinctive positions [27]. Thus, the power of firm's technological capability is determined by its ability to effectively combine these resources and capabilities [28]. Therefore this study adapts the dimension of

technological capabilities from reference [24b] the strategies consist of technology sourcing and research and development capabilities.

Technology pioneering or follower posture simply refers to the business firms seeking to have the best new technology and be the pioneer or follower to introduces new technology or enter the market with better and new products [24c]. Pioneering in theory is the very first firms to introduce new product or technology into the market/industry, while in practice it refers to one of the first to do [29]. Therefore, Nigerian manufacturing firms' decision to enter new market may be critical not only to their growth, but also for firm's survival, sustainability and development in general. This is because overestimations of the firm's dynamic capabilities in the new market can jeopardize the future of the firm, and underestimation can lead to inability to exploit opportunities for growth and innovation [30]. Hence, reference [31] counseled that pioneering is a function of firm's technological abilities; thuspioneering is beneficial only for businesses that are technically viable and strong, while pioneers business with low technological abilities suffer from survival challenges to introduce new product in the market. This may be the reason why manufacturing firms' in Nigeria are unable to exploit the potential opportunities in their environment.

Business firmsacquire or develop important technologies internally through R&D or externally through joint ventures, licenses, strategic alliance and acquisitions. The capabilities theory stresses the significance of developing unique capabilities [32], however does not evidently state which sources either internal or external is to be preferred [24d].According toreference [33], four important issues exist in technology sourcing strategy, comprising what technologies to develop, the cost and appropriateness of current technologies in attaining business goals, whether to be pioneers in those technologies, and whether to protect or share new technology development with other stakeholders.

The Role of Research and Development toward Innovation

The role of research and development (R&D) in a firm is to develop important basic knowledge or enabling technologies which improves firm's ability to innovate or uses inventions from other. Generally, R&D can help SMEs firms boost their employee's knowledge, attract, absorb and retain expert talent, explore external knowledge, and improve innovation capacity [34]. Therefore, firms that engage in R&D are often the reservoir of technical know-how whichhelps develop and implement new technologies [35]. Even though SME in most case are the recipients and beneficiaries of R&D spillovers from knowledge generated by the R&D activities of their larger counterparts and universities [36]. However, investment in R&D may be beneficial to the SMEs survival and growth particularly in today's turbulence dynamic business environment.

Companies R&D intensity is avital strategy that indicate its commitment to innovation through systematic generation and commercialization of new ideas [37]. The importance of R&D in innovation and business performance have become more widely understood, thus presently apart from private businesses, some governmentsacross the globe have improves the favorability of their environment and policies to support business R&D, this includessubsidization in the R&D activities and increases global competition to attract R&D investment frominternational companies [38].

Research and development play a substantialrole in organizations innovation activities and overall performance [39]. It helps firms to innovate, increase productivity, improve or create new products markets, ensuring competitiveness and growth, and leading to both private and social benefits [35b]. Thus, reference [40] urged that without a sufficient increase in R&D activities, business organization cannot sustain satisfactory innovation to improve declining revenues steam due mainly to expiration of successful products patenting. Therefore, firm's substantial investments in R&D influences the direction and magnitude of technological change, it help to match the capabilities of competitors particularly in a dynamic environment [41], and it enhances the firm's ability to absorb relevant knowledge and information that promote it technology spillover and improve its R&D capabilities [42].

The role of SMEs in R&D activities has significantly increase nowadays,though theyinvest less on R&D in real terms, but demonstrated a greater R&D intensity than big companies [43]. However, firm R&D investments on innovation activities and capability to increases the level of technological competences depends on the size of the firm; the higher the volume of R&D investment, the better will be the level of technological progress [44]. Therefore, organization may be less competitive if itinvestsless particularly below the industry average. Nevertheless, R&D performing SMEs are dynamic sub-group among innovative firms expected to greatly contribute to economic growth and job creation in the EU, particularly in its bit to achieve the 3% R&D intensity target by 2020 [45]. Therefore, in the light of these prevailing socio-economic objectives, companies must not contemplate investingmore in R&D as it leads to positive returns for significant investment, particularly above the industry average, especially in the short term [46].

Through research and development firm explore different ways of handling technical hitches, identify better technologies to produce and supply goods or services to satisfy the customer needs more than competitors to increase market share and profitability [47]. This is because the major determinant of firm's innovativeness is

the innovative effort, measured by R&D spending, and the number of machinery and technologies acquires, that is both tangible and intangible firm's investments [48]. Reference [49] urged that usually the bases for measuring firm's intangible assets as independent variable is R&D activities. While, reference [50] suggested that owners and managers of SMEs must be committed in developing new technologies and utilization of the available technologies for better performance.

Sources of Technology and Innovation

Due to the resultant effects of shorter product life span, the multidimensional nature of most technologies and the increasing complicated knowledge processes, businesses are progressively engaging in knowledge sourcing externally to supplement their internal research and development activities [51, 52]. The contribution of external source of knowledge in determining innovation has been adequately emphasized in the open innovation theory [53]. At the center of the open innovation theory is that, organizations can achieve important knowledge and skill for innovation from various external sources [54]. Organizations may involve in open innovation in two ways: (1) inbound and outbound open innovation [51b].

Inbound innovation means the internal technology transfer, where organizations scan and evaluates their operating environment with a view of identifying sourcing knowledge and technology and blend them into their knowledge base [54b]. Contrarily, outbound innovation consists of transferring technology from outside through which organizations looks for external organizations that are superior appropriate to operate the specified technology [55]. Therefore, firm's ability to continually beat rivals depends on the access to valuable external resources and information distinctively held by some other participants in the market [56]. The growing pressure from competitors and the rapid change in technology in business environment today have made alliance with other partners an essential condition for persistent market success [57]. This increased collective activity, purposefully introduced by companies in their determination to outperform rivals; leads to development of an alliance of inter organization relations in the form of strategic network [58].

Conceptual Framework

The theoretical framework of this study was advances based on resource based view (RBV). The underline principle of RBV entails that firm's possesses a bundles of distinct and valuable resources that are inimitable and non-substitutable overtime. Consequently these resources must be perpetually develops to ensure sustainable competitive advantage and superior performance [59]. RBV perceived firm's resources as capabilities and assets that drive firm's techniques to successfully achieve desired goals [60]. Therefore this study considers the dimension of technological capability (internal R&D capability (IRDC) and external technology sourcing capability (ETSC) as potential SMEs valuable and distinct resources that enhance SMEs performance. Figure 1.1 below depicts the conceptual framework of this study.

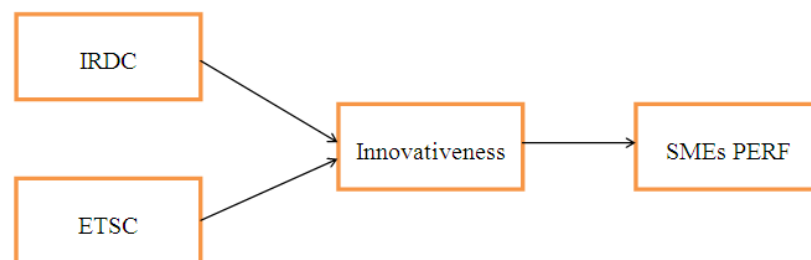


Figure 1.1

Conceptual Framework

III. Conclusion

The desire for growth and enhancement of the manufacturing firms' capability to improve business performance and economic development has drawn the attention of business managers and academician. Hence, low product quality, low productivity, and high cost of production constraints the operation of most small business in developing countries like Nigeria; consequentially these businesses are unable to perform up to expectation. However, technological capability is generally seen as essential catalyst for improving the innovativeness, competitive position and performance. This study therefore, demonstrated how technological capability help SMEs firms develops a novel idea that promotes innovation strategy to efficiently respond to dynamic environment. The study also suggests the importance of TC to develop innovation strategy and improve performance.

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